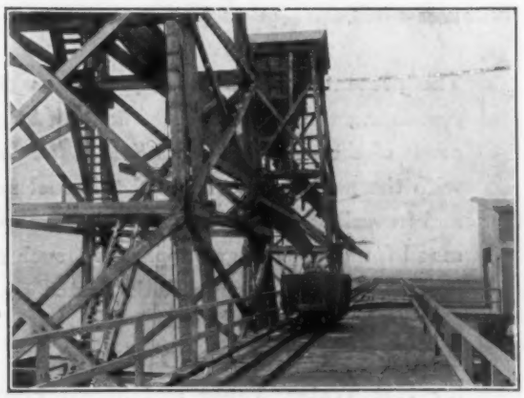
American
GAS JOURNAL
Formerly American Gas Light Journal
EST. 1859

VOL. 119. No. 25
WHOLE NO. 3437

NEW YORK, SATURDAY, NOVEMBER 24, 1923

Subscription $3 per year
$4 Canada $5 Foreign

"The Gas Industry Has Come Out of Its Trance!"



The above illustration shows how coal is unloaded at the waterfront, in a Southern City by means of a Hunt Tub Rig, and transported by Hunt Motor Cars to storage bins.

These cars are used where material is to be distributed in any system of closed or open storage where tracks can be laid. They are equipped with either one or two motors and overhead or third rail collectors.

They are especially adapted to handling coarse or abrasive material. Car bodies are built of wood, steel lined or all steel and of a design best fitted to meet existing conditions. Catalogue 22-1-J gives full details.

"THE future now looms bright to every gas man. Industrial gas has made its entrance into the gas field, has come to stay and develop until it attains full growth."

These stimulating words form part of an editorial in The American Gas Journal, October 27, and were written from a careful study of past and present conditions in the gas industry and the trend of the future. It is clearly up to you gas men to capitalize this tremendous opportunity.

As an advancement toward this end, it would be wise to be thoroughly prepared to supply the extra demand that will accrue. Therefore, a critical survey of all gas manufacturing equipment should be made, especially coal handling apparatus; for it is upon the readiness of this machinery to perform its function rapidly, efficiently, with least cost for labor and upkeep, that an abundance of coal, the first requisite of gas making, is assured.

If you need help, just drop us a line; Hunt engineers with over half a century of material handling experience and a mass of accumulated data, will quickly come to your assistance.

The foregoing suggestions are based on our own experience. Hunt Cost-Cutting Equipment would never have maintained its high position in the handling of bulk materials for over half a century were it not for the far-sightedness of its makers, who have kept pace with every development in every industry—40 years of which has been devoted to handling coal, coke and ashes in the gas industry.

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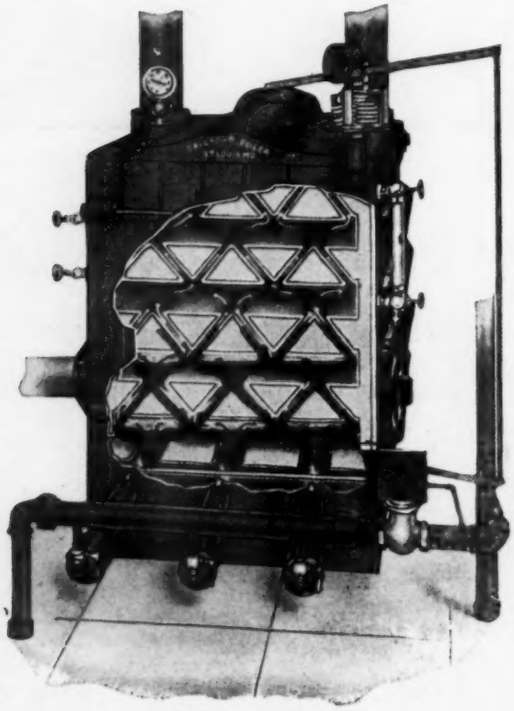
Index to Contents, Page 4

Advertising Index, Page 33

Other Gas Companies Are Doing It!



Send for our booklet and terms and learn how Gallaher Gas-Fired Boilers will increase both Volume Sendout and Profit.

TO educate the masses to the convenience, cleanliness, economy, wastelessness, safety and all the other virtues of house heating by gas, will take time and patience; but if the start is not made the goal will never be reached.

Yet there are some gas companies who have approached the house-heating-by-gas problem in an earnest, systematic manner; notably, The Laclede Gas Light Co. of St. Louis, who have surmounted all of the difficulties and whose efforts have been entirely successful.

The present time is most propitious for forcibly presenting the advantages of heating by gas, on account of the unsettled conditions in the coal industry with the possible shortage of this fuel next winter, and householders are therefore in a more receptive mood for improved gas appliances, such as the Gallaher Boiler and Storage Tank Heater.

GALLAHER GAS-FIRED TUBULAR BOILERS for Hot Water, Vapor and Steam Heating when shown, lower the sales resistance to this type of house heating and make easy the introduction of gas into a new realm of usefulness; to the satisfaction of the customer and profit of the gas company.

GALLAHER BOILER CO.

Laclede Gas Building, St. Louis, Mo.

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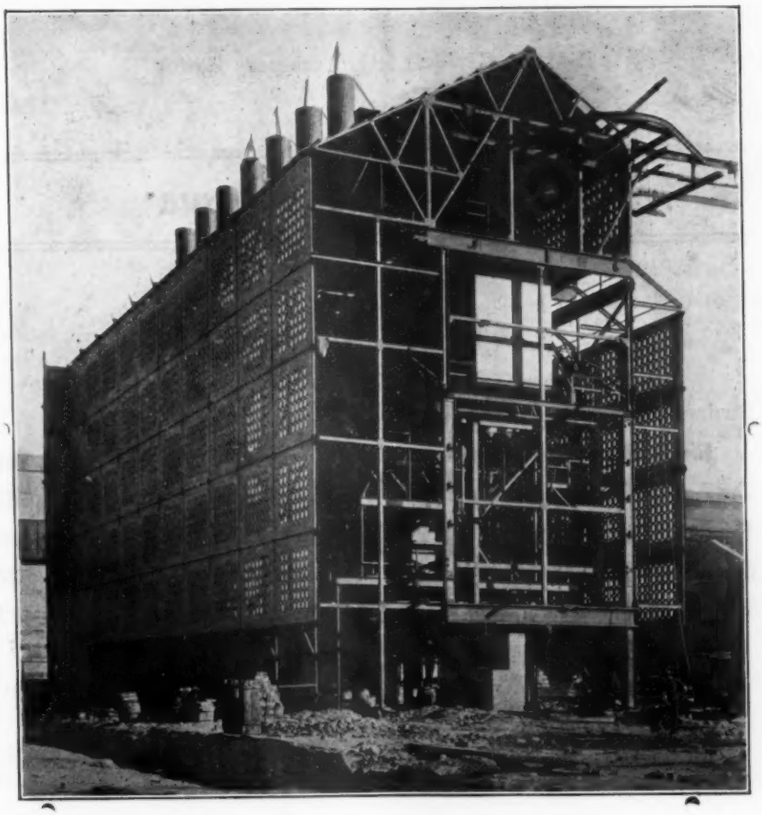
Installed in all parts of the world—Suitable for large and small plants—Maximum results with minimum labor—Ease of regulation of heats and working—Free access to all working parts—Simplicity and strength of construction.



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American Gas Journal

SIXTY FIFTH YEAR

Published Weekly by American Gas Light Journal, Inc., 53 Park Place, New York, N. Y.

S. G. KRAKE, Pres. & Treas. C. S. MYERS, Vice-Pres. A. M. GLEASON, Sec'y.

STANTON G. KRAKE, Managing Editor

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Contents of This Issue

Business Conditions Afford Little Cause for Worry—
By L. W. Alwyn-Schmidt **565**
The Actual Cash Value of a Public Utility—By McGregor Smith **567**
Presenting Gas News to the Public—By B. J. Mullaney..... **569**
Fundamentals of Condensing and Scrubbing—By W. H. Earle **572**
As the Journal Views It..... **575**
New Publicity Agents
News of the Gas Industry..... **581**

Subscription $3.00 per year, including postage, in the United States, Mexico, Cuba, Porto Rico, Hawaii or the Philippines; in Canada, $4.00; foreign, $5.00—Single Copies, 10 cents.

AMERICAN GAS JOURNAL, November 24, 1923. Vol. 119. No. 25. Published weekly by American Gas Light Journal, Inc., New York, N. Y. Entered as second-class matter Jan. 9, 1917, at the post-office at New York, N. Y., under the Act of March 3, 1879.

AMERICAN
GAS JOURNAL

Vol. 119. No. 25 NEW YORK, NOVEMBER 24, 1923 Whole No. 3437

Business Conditions Afford Little Cause for Worry

Christmas business depends upon wise selection of merchandise--Purchasing reserve becoming stronger

L. W. Alwyn-Schmidt

THERE has rarely been in recent years a market condition like the present, wherein many of the acknowledged indicators of the economic barometer appear to show storm readings, but where at the same time ocular evidence seems to contradict the findings of the analytical economist. A most likely explanation for this peculiar situation is to be found in the underlying structural strength of our present prosperity. This has been an important factor all through last summer and autumn. Possibly the wage-earner who has so carefully guarded his savings all along has come to the conviction that this policy is not a wise one to follow much longer in view of the many attractive prizes offered in nearly all fields of production. Because whatever statistics may show, it is a bargain hunter's time just now where ready money, spent wisely, has a very satisfactory purchasing power.

Important Factors Now Are Adjustment of Sales Prices and Selection of Merchandise

The extent of the Christmas business, therefore, will be very much a matter of adjustment of sales prices and especially of selection of merchandise. Industry and distributor are often inclined to misjudge their opportunities in this respect in a mistaken attempt of cutting prices where a wiser selection of merchandise would have been the better policy. It has been repeatedly proven that the cost of an article in itself is no deterrent to the buyer if it is high, nor an inducement if it happens to be low. That the character of the article should appeal to the customer is by far the more important condition. Hence the latent purchasing power of our national consumer can be turned into active purchasing energy only by a careful selection of the merchandise offered, eliminating in this manner the obvious drain upon industrial earnings which must always follow a general lowering of prices.

General Lowering of Prices to Be Avoided.

The latter, in fact, is a condition that should be avoided most carefully in view of the fact that manufacturing profits have already been cut very finely during the last months. Especially as there is little hope for the manufacturer of improving his margin of profit in the near future by reducing manufacturing cost. But the production of merchandise, attractive to the consumer, should not present any unsurmountable difficulty. It may mean a short cut in manufacturing practice in one case, standardization of types in another, limitation of selection in a third. But a way will be found most certainly, and has already been found by certain industries, with the result that business continues to be good in these fields, or is reviving most rapidly.

Intrinsic Character of American Economic Life Affords Solution of Problem

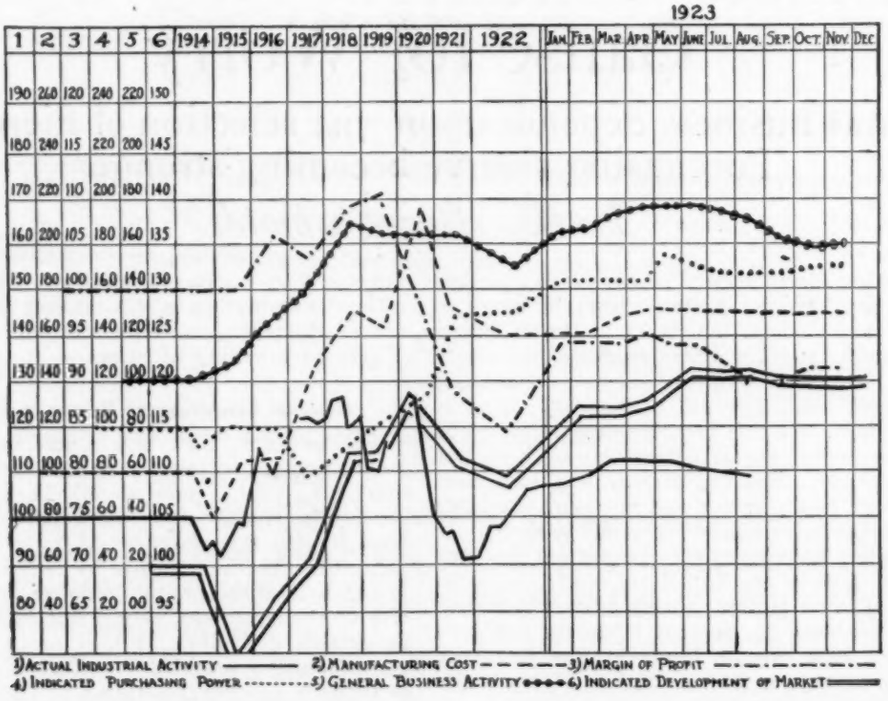
This process of modification, standardization and limitation finds somehow a particularly fruitful ground in our own American industrial soil. It fits in well with American labor conditions, engineering practice and the general trend of our economic life. It will provide the solution for our present economic problem by rendering available a proper balance between the consumer's ability to pay and inclination to purchase on one side and the desires of our industry to produce saleable merchandise economically on the other. But this balance can not be completely

attained if it is not supported by a policy of industrial protection. This is the reason why the protective tariff policy plays so different a part in the economic life of the American nation than in that of the considerably smaller economic entities of Europe. Protection in our case does not mean anything but protection of the economic balance of our own market against the appearance and influence of foreign factors which are likely to disturb its equanimity. If proof were wanted of the correctness of this contention, it could easily be deduced from the recovery of our markets following the recent readjustment of the tariff and the comparative absence of such disturbing incidents as labor troubles in the so-called key industries.

There is on the one side the consumer, well employed, well paid and well secured in his position by invested savings. And on the other stands the producer with a productive equipment, fully paid, with sufficient funds for further expansion and backed by a banking organization which may easily be called the strongest of the world. The two combined, acting in turn as buyer or seller, provide today the material from which must come any new energy to move the economic curve.

Good Christmas Business Expected

For the time being little more can be expected than a good Christmas business with a turnover



Forward Economic Movement Has Stopped

There is no doubt now that the economic forward movement caused by the various forces acting during the early part of the year has come to an end and that the flattening out of the curve has become permanent. But the elevation of the curve remains high. It is very much higher than could reasonably be expected and leads to the conclusion that any new forward movement will exceed even the high points reached during last summer. But it is very difficult to predict when this new forward movement will commence. The larger the quantity of matter, the deeper and broader the flow of the current, the more powerful must also be the force necessary to set it in motion. It is this very absence of locomotive forces which illustrates the strength of our present market situation.

most likely larger than that of last December. But as time goes on, the position of the purchaser will improve. Prices for life's indispensable necessities are not increasing sufficiently to deplete his savings or to weaken his surplus of earning power over ordinary spending requirements. So after a while the influence of the steadily accumulating purchasing reserve will make itself felt by an increase in the desire to buy. Today this desire is still not large enough to produce any effect on the market. It is not sufficiently diversified and extensive to end the deadlock. But pending an actual catastrophe, it must come to a point where it becomes more desirable for the savings bank depositor to turn money into more tangible assets, and then buying will begin on a scale large enough to be felt, first in the retail stores and a little later in the factories.

In the meantime manufacturers and dealers will have little cause for worry.

The Actual Cash Value of a Public Utility

The elements in determining the same

McGregor Smith

Assistant Engineer, Tennessee Public Utilities Commission

THERE does not seem to be any definite fixed method by which the actual cash value of a public utility property may be determined for assessment purposes. In other words, it is something not susceptible to an exact mathematical or scientific determination. If the cash value of the outstanding securities could be obtained this would be the actual cash value, but under normal conditions this perhaps would not be obtainable in more than one case out of a hundred. Therefore, in determining the actual cash value of a public utility property all of the elements of value should be analyzed and worked out from the viewpoint of a prospective purchaser.

Elements of Actual Cash Value

The primary elements of value seem to be as follows:

1—Gross Revenue Value.
2—Net Earnings Value.
3—Physical Property Value.
4—Value of Outstanding Securities.

Gross Revenue Value

Probably the prime consideration in determining actual cash value is the amount of gross revenue. A prospective purchaser's first question perhaps would be, "What is the present annual gross revenue received by the Utility?" After having obtained this information, he would immediately make a comparison in his mind with another utility with which he is familiar having approximately the same revenue. He knows what the average operating ratio (the ratio of operating expenses to the gross revenue) should be, and from this he is in a position to calculate the return on the investment. From experience he has learned that the gross revenue has a fixed ratio to the investment and as a check upon other values he figures the property worth so many times the gross revenue.

In other words, a purchaser considers that he can take the gross revenue, curtail or increase expenses as circumstances require, and arrive at a result which would make the property worth to him so much in dollars and cents, so this element is in fact a prime consideration in determining actual cash value.

Naturally there are other matters of detail connected with the gross revenue analysis such as the revenue derived per customer, the number of customers per hundred population, showing whether or not the territory is fully covered and the class of customers to whom service is rendered, etc.

Net Earnings Value

A second element of actual cash value is the present net earnings of the utility, for certainly a property is only worth an amount on which it will earn for the investor a satisfactory return. It may be that the prospective purchaser feels that he can curtail expenses, and increase the present gross revenue thereby increasing the net earnings, but nevertheless he does consider the actual results of operation under existing conditions, and this consideration does have its effect when the cash offer is made. Therefore, to capitalize the net earnings is another method of determining actual cash value.

Rate of Capitalization

The rate of capitalization depends upon several factors. First, the true net earnings must be ascertained and to do this care should be taken in examining the operating expenses to see that proper salaries are charged, for, as a general rule, the smaller utilities do not charge salaries for management, but instead take the remainder of the revenue after all expenses are paid, thus receiving compensation for services and interest on money invested in one item, when, as a matter of fact, services for management are worth something entirely independent from interest on the money invested in the property. This is only an example of one item to be looked to in determining the true net earnings, there are others equally as important which should be fully covered in an examination of operation expenses.

After determining the true net earnings, it next remains to capitalize this amount at the proper rate which, in turn, depends upon the size of the utility, its financial set up, the class of utility and the general stability of the investment, as compared with other classes of investments, inasmuch as investors seek different kinds of investments, one demanding the highest rate of return with a reasonable margin of safety, while another demands absolute safety of principal, satisfied with a lower rate of return. It is a combination of these economical principles which governs the rate of capitalization.

A public utility, being virtually a monopoly and subject to State regulation, as an investment, is

looked upon as being more stable than certain industrial investments and therefore a lower rate of capitalization of the net earnings for the determination of actual cash value should prevail.

Physical Property Value

A third element to be considered in the determination of actual cash value is the actual physical property. It may be taken on an investment basis (what the property actually cost), or upon a reproduction basis (what it would cost to construct the present property). Each one requires separate consideration. If a rate base has been established, then this would be an element from a physical property standpoint to be considered in determining actual cash value, inasmuch as the regulatory body has gone on record as saying that this is the value of the property on which a reasonable return shall be allowed. But the rate base is by no means the actual cash value of the property. Decision after decision of the courts sustains this proposition and every principle of economics upholds it. The regulatory body might fix a rate base and state that a reasonable return should be allowed on the base so fixed, but unless the rates for service are equal to or less than the value of the service rendered, consumers will not take the service and there will be no reasonable return.

Another example illustrating the clear distinction between an actual cash value and a rate base value is that of two utilities having the same rate base, one earning a 7 per cent return and the other earning a 9 per cent return, by virtue of its low rates for service or peculiar operating conditions. Certainly the one giving the lower rates and earning a higher rate of return has a higher cash value.

The physical property value, however, does enter into the determination of cash value when the rates for service can be fixed within the limits of what the service is worth, then this physical property has a potential earning power which can be converted into real net earnings by proper showing before the regulatory commission. Therefore, for the purpose of arriving at the correct assessment on an actual cash value basis, this element of value should be given its weight of one with the other elements heretofore mentioned.

Value of Securities

The fourth element to be used in determining the actual cash value is the market value of the outstanding securities. If all of the securities could be purchased, the property would be owned outright and the real actual cash value thus determined. Were the securities of the local utilities dealt in widely then the true market value could be obtained, but when they are held in the main by holding companies the quoted market value is not necessarily the actual cash value of the property and, therefore, it is only one element to be considered along with the other elements of value in arriving at the actual cash value of property. As a rule, there is no quoted market value for the securities of the smaller utilities, and in such cases the value must be arrived at by taking the earnings available for interest and dividends and capitalizing the amount available for each class of security at the rate which the different classes of investors will demand. That is to say, the bonds will demand the lowest rate of return, the preferred stock a slightly higher return and the common stock a still higher return. This, however, does not determine accurately the value of the securities, but serves only the purpose of arriving at an element of value to be considered with the other elements.

Average Value

After four values are obtained upon a basis of the elements heretofore mentioned, an average of these may be taken as an index of value to be looked to and compared with any of the four values. This average value may be multiplied by an equalization factor, or factor of safety, whatever it might be called, to assure that the final value determined from four entirely distinct elements is not in excess of a cash value. It must be remembered that a cash value is something less than the purchase price of a property bought on terms, or through a transaction of securities. Therefore, if a factor of eighty (80%) per cent is applied to the average value, a value for assessment purposes is determined which is composed of all of the main elements of value and results in an equitable assessment to all.

It will be well to again state that this rule or formula cannot be applied to every case, but the applicability of same will depend upon how great a variation there is in the values determined along the lines above discussed.

Workability of Formula

As an example of the workability of this formula it is here applied to a gas company for the year 1922. In the determination of the assessments of the larger utilities, the gross revenue value was taken to be three times the gross revenue for electric lighting companies and four times the gross revenue for gas companies. This gas company, being engaged in the manufacture of gas only, its gross revenue was multiplied by four. The results are as follows:

Gross revenue times four (4)	$2,509,583.00
Net earnings capitalized at 7%	2,448,563.00
Rate base Dec. 31, 1922	2,746,920.00
Market value securities (est.)	2,530,000.00
Average value	$2,558,766.00
Average value times 80%	2,047,013.00

The closeness of the results of this analysis is surprising, but it is typical of many assessments computed on the same basis. Occasionally an element of value will be out of line and must be eliminated and sometimes even another method of assessing must be resorted to.

A further example of the workability of this formula is here given showing the results for a much larger utility than the one illustrated above, and one

(Continued on Page 577)

Presenting Gas News to the Public*

Many phases of publicity work discussed in section chairman's report

B. J. Mullaney

People's Gas Light and Coke Co., Chicago, Ill.

THE Publicity and Advertising Section of the American Gas Association has had, on the whole, a good year. While more was planned than was actually done, in some directions, in others the results have exceeded expectations.

There will be no attempt in this report to tabulate results in detail, because tabulation, even if it were feasible, would unduly emphasize facts of lesser importance and obscure the more important. Advertising and publicity results, in their more significant aspects, are not of a kind that can be weighed, measured or expressed by a plotted curve. But, in so far as results of the year can be reduced to specific terms, they should offer to all who have had to do with them—in other years as well as during the 1922-1923 period—abundant inspiration to further constructive effort.

In considerable measure, the record of the passing year has been a harvesting from plantings by previous administrations of the section; pioneering in a region not only unexplored but largely unregarded, in so far as the manufactured gas industry was concerned, until the Publicity and Advertising Section was organized a little more than four years ago.

Convention Program Reflects Section's Work

Something of what has been done in those years is reflected in the section's share of the program for this fifth annual convention of the American Gas Association. As you may see there, the section advances year by year from the theoretical to the actual; from "we ought to" talking to doing. Our sectional sessions, plus the section's contribution to the general session programme, provide practical papers, addresses and discussions, by practical men, on practical ways and means of getting practical results that are of prime importance to the industry and to every company, namely:

1—Better Public Relations.
2—Larger Sales of Gas and Goods.
3—Increased Income and More Profit.
4—More Satisfied and Efficient Employees.
5—Greater freedom in developing company business.

Therefore, it is respectfully submitted that the particular kind of association work represented by the Publicity and Advertising Section is entitled to unquestioned recognition, now and hereafter, as of major importance in the stabilization, development and extension of the manufactured gas industry.

Three Main Achievement Items

More specifically, the work of the year and its results are separable into three fairly distinct items, although in consequences, as in all other respects, the three are closely inter-related. They are:

1. Closer co-operation with State (sometimes regional) Committees on Public Utility Information (or information bureaus), of which there are now 25 operating in 34 states; that is, fuller utilization of the best machinery yet devised for furthering intelligent understanding of public utilities by the general public, with consequent favorable reaction upon legislative, rate, regulatory and financing problems.
2. Advertising by gas companies beneficially increased and the influence of it enhanced by extension of the A. G. A. Advertising Service and by affiliation, through the Public Utilities Advertising Association, with the Associated Advertising Clubs of the World, which organization bears about the same relation to advertising, in all of its aspects and interests and ramifications, that the American Gas Association bears to the gas industry, or the U. S. Chamber of Commerce to the commercial bodies of the nation.
3. Newspapers and other publications brought into better understanding of, and relations with, the industry: important because, generally speaking, newspaper attitude (friendly, unfriendly, or just indifferent) toward the industry is incontestably a main factor in determining the attitude of the public; and that, in turn, determines the attitude of, and to a large extent action by, legislatures, commissions or other regulatory bodies, and investors.

The direct value of these results to our industry and to every company in it, even to those that are doing little to help themselves—dollars and cents value—is no longer debatable. Better business conditions and better business—increased sales of gas

*Read before the opening meeting of the Publicity and Advertising Section at the Fifth Annual Convention of the American Gas Association in Atlantic City.

and of merchandise and appliances, fairer and more stable rates, surer net return and easier financing—all these are following improved public relations as surely as the day follows the dawn. Hence the desirability of continued constructive effort in the particular fields which have just been described.

Getting Much for Almost Nothing

Closest possible co-operation with State committees is important because these agencies do for the industry, and for participating companies, much that the industry and the companies cannot do for themselves; and (a not negligible consideration) they do it for almost nothing when the cost is compared with result-values. The point is this:

Public enlightenment on the problems of the industry and of its companies is still needed. There is not enough money in the industry to pay for getting all of it adequately done by means of paid advertising alone. Doing a considerable part of it is the function of State committees. They are making good at it, wherever they are receiving proper co-operation, because they are (and this cannot be said too often) the best machinery for doing it that has been as yet devised. Their history is proof.

The first State committee was formed (in Illinois) only four and one-half years ago. As the plan made good, it was taken up elsewhere, until now there are 25 committees operating in 34 states, all following the same general plan. (See sectional program, Thursday afternoon, October 18, for concrete significance of State committee work.)

Still closer co-operation next year with State committees by the American Gas Association, and especially by member companies in states that have committees, is desirable for two specific reasons, namely:

1. In several states other public utility industries are getting relatively more out of the State committee plan than the gas industry is, simply because they are making better use of it.
2. The ground work has been laid at A. G. A. headquarters for doing things that will make State committee work still more effective for the gas industry than it has been, if this ground work is consistently developed and extended by due co-operation from member companies.

Other Concrete "State Committee" Profits

This closer co-operation is a job for chief executives and for lesser officials as well. Intelligent publicity work for the gas industry is distinctly not alibi manufacturing; it is anything but that. Information—accurate, comprehensive information—is the very body and soul of it. Up to date statistical data and business development information is especially useful and usable.

Hence it would seem that lesser officials and especially technical men — engineers, chemists, accountants—should want to do their part in "feeding," and co-operating with, State committee work. As personal return for their interest, it is conceivable that they may thus gain a recognition of their importance in the industry which, they sometimes complain, is now inadequate.

This co-operation will pay in specific as well as in general return. Instances are of record in which State committee directors have been incalculably helpful to individual companies in delicate public relations situations when they have been permitted to be "of counsel." For, be it remembered, the competent director of a State committee is a specialist in a technique that is as definite as that of the chemist or the engineer.

Advertising—Some Points Easily Overlooked

Upwards of 225 member companies, nearly one-half of the association membership, now use the A. G. A. Advertising Service. This is a 50 per cent increase for the year. The service has also stimulated individual advertising by member companies. Inquiry has developed that in various states gas company advertising has increased from 25 to 200 per cent during the year.

The significance of this, especially in beneficial reaction upon the industry, goes farther than the mere statement implies. All the world recognizes the place of advertising in modern business. Consistent employment of it tells the world that ours is an on-its-toes, up-and-coming industry, and not one that "has seen its best days," as Babson once had it. There is real money value in that.

By advertising Advertising, the section promotes realization that the commodity, gas, and gas service, as well as merchandise and appliances, can be sold into broader use and better understanding, as chewing gum, men's clothing and motor oils are sold. Obvious fields for "cashing" this realization, to name only two, are: (1) advertising to extend the industrial use of gas, and (2) advertising to hold what we have against competition, as electricity, for example, which is in some places becoming a real competitor for the important cooking load.

Where the P. U. A. A. Affiliation Comes In

By affiliation with Organized Advertising through the Public Utilities Advertising Association, which is a departmental of the Associated Advertising Clubs of the World, much as this section is a part of the American Gas Association, our industry is getting "in step," greatly to our advantage with influences that are worth more than casual attention.

There are some twenty odd departmentals (similar to our A. G. A. sections) of the Associated Advertising Clubs of the World, the associated clubs having upwards of 20,000 active members. Each departmental represents some distinct advertising interest, as, for example: Newspaper Executives, Agricultural Publishers, Trade and Technical Papers, the Religious Press, Motion Pictures, Financial Advertisers, Community Advertisers (Chambers of Commerce, Business Men's Associations, etc.), Church Advertisers, Industrial Advertisers, Retail Stores

and a dozen other groups. Compositely, these federated groups represent advertising in all of its ramifications and the federation functions actively both to advance and to protect the interest of members.

Being "One of the Family" Helps

One typical activity of this federation is the Better Business movement and the resultful campaign against fraudulent stock company promotions, which should be of some collateral interest to all of us who are concerned with Customer Ownership; another is an active and efficient legislative committee; another is the promotion of the community-of-interest spirit among all legitimate businesses, something distinctively advantageous to our industry.

Becoming "one of the family" in such activities would seem to be a positive gain, to say nothing of many others. To name only one of the others: it is something to be in a position, by direct contact with agencies that are talking to the entire public day by day, to promote the thought that Public Ownership contains no nourishment for any business that touches advertising—publishing (of newspapers or other periodicals), printing, photo-engraving, lithographing, bill posting, paper and ink industries, and so on.

Newspaper Relations—Progress and Some Opportunities

Better understanding of the industry by the press of the country, and therefore better relations with it, have been advanced primarily by the State committee and the advertising activities already discussed, plus personal contact with newspaper association work. That is not to say or imply that newspaper attitude has been or can be affected by our advertising; we have no right to expect that; when we buy advertising space we get full value for our money and are entitled to nothing more; but it is to say that our general attitude and policy, as reflected in the activities mentioned, has produced favorable reaction in the newspaper field.

The representative and comprehensive newspaper organization of this country—from coast to coast and north from Mexico—is the American Newspaper Publishers Association, with a membership of several hundred newspapers, all the best dailies. Another important one—probably the most important next to the A. N. P. A.—is the Inland Press Association, representing the leading papers of fifteen middle western states and a part of Canada. Both have specifically recognized the work which this section of the A. G. A. has been promoting.

The Advertising Bureau of the A. N. P. A. has advised its members to take the initiative in helping us solve some of our advertising problems; to get in touch with local companies that may be inexperienced and inexpert in advertising and help them work out effective and profitable plans and copy. Co-operation of this kind has been established during the year in several places, and it offers abundant opportunity for further attention. The Inland Press Association has recommended to its members hearty co-operation with our industry's policy as reflected in the activities previously mentioned.

"Velvet"—And More to Come

All this, mark you, and more to come, as we continue this enlightened policy is "velvet." For advertising pays on its own account, and opportunities for gas companies to make it pay are almost unlimited, entirely apart from use of it in selling merchandise and appliances.

To illustrate: The public has had gas service a long time. It is an old story—taken for granted—although the present generation does not know much about the significance of it. ADVERTISING gas and gas service is the logical way to counteract this and check tendencies to "try" something else, electric cook stoves, for example. Then the expanding opportunities for gas in the industrial field—that is a situation ready made for profitable advertising.

The more consistently and intelligently gas companies thus employ advertising, the larger the crop of public understanding and good will; and that, it is respectfully submitted, never can be too large. Respect for the industry and, conversely, the industry's respect for itself, are enhanced. Among those agencies which have most to do with influencing the public opinion that rules our business, we gain in two ways: on one hand we are lifted from the class of businesses that are considered the natural prey of "special edition" and "charity" advertising solicitors; and on the other, we escape classification with the "space grabbers" and "free publicity schemers" who are anathema in every newspaper office.

Some Recommendations and Acknowledgments

The foregoing is all predicated on dealing with things as they are, not as some of us may think they ought to be. It points the way to practical and time-tested ways and means of advancing the industry. Continued promotion of the work already well started, as described, is obviously the fundamental recommendation for the work of this section in the immediate future.

The industry is full to bursting of material that is news, when properly presented, and helpful when printed. To name but a few sources: There is the smoke nuisance and the place of gas fuel in solving it. There is the coal question: a searching all over the world for relief from dependence upon raw coal for general fuel purposes. (Think if the iron and steel user had to take the raw ore and do his own converting, as the heat user has to convert raw coal into gas and ash before getting his heat.) There is the injustice of the prevailing rate system in its discrimination against the customer of small means, the workingman and his family, in favor of the occasional "convenience" user of gas, because the unin-

(Continued on Page 577)

Fundamentals of Condensing and Scrubbing*

Study of primary condensation calculations

Report of 1923 Committee

W. H. Earle, Chairman

Rochester Gas & Electric Corporation, Rochester, N. Y.

YOUR committee was appointed this year to replace the 1922 Committee on Gas Plant and Production. Its scope, wtihin the field of Gas Manufacture, was designated as that included between the hydraulic main of the coal carbonizing plant, or the wash box of the water gas machine, and the inlet of the purifiers.

Obviously this open up a tremendous range for committee activities. It includes all phases of operation pertaining to condensers, exhausters, ammonia scrubbers, tar extractors, ammonia concentrators, ammonium sulphate equipment, and other apparatus in the usual sequence, together with all auxiliaries pertaining thereto.

Primary Condensation

For the present year it has been the purpose of this committee to confine its efforts to the initial stage within its assigned field, viz, primary condensation, in the hope that it can initiate a systematic study of the field to be progressively developed by future committees.

The attention of the committee has been emphatically called to the apparent fact that, in the study of the operation of existing condensing systems, and in the planning of new systems, there is a regrettable lack of knowledge and understanding of the prime factor. This factor appears in the fundamental question.

What is the saturation temperature of the gas at the inlet of the condenser?

The meat of the problem is in the word "Saturation."

Saturation Temperature

By saturation temperature is meant, the temperature at which the gas is saturated with whatever quantity of water vapor it carries. (Condensible tar vapors are included as water until such time as research develops a significant difference between them.)

A leader in the industry writes, "In my own calculations on the sizes of condensers, the amount of cooling water to be used, etc., I have disregarded entirely the sensible heat of the gas and have considered only the latent heat of vaporization which so greatly exceeds the former as to make it practically negligible.

The importance of this term cannot be too strongly emphasized. It is the key to the entire problem of primary condensation. The heat to be removed from a 1,000 cubic feet of dry gas is insignificant in comparison with that to be removed from the same volume of gas if the gas is saturated with water vapor. Furthermore, the heat to be removed from the gas in cooling it to any desired temperature is insignificant in comparison with that to be removed in condensing the great bulk of tar and water vapors.

Cost of Cooling Surface

The figures in Table (2) showing the cost of the cooling surface are based on cooling gas at the rate of 10 million cubic feet of gas per 24 hours. These figures do not take into consideration the cost of the condenser shells, grids, pumps, piping, etc., which are affected by the saturation temperature of the gas, but not to the same extent as the cooling surface. The assumptions are based on the most economical use of cooling water.

Table (2) was compiled for the client of a builder of condensing systems to illustrate and emphasize the significance of saturation temperature. While the figures apply to a large plant, they are relatively true for a plant of any given size. So far as costs are concerned the table must be regarded as illustrative and not as a basis for cost estimates.

Table 2

Compiled by The Steere Engineering Co.

Temperature Gas Saturated with Water Vapor at the Inlet of Condenser	Temperature of Gas at Outlet of Condenser	Temperature of Water Used for Cooling	Cost of Cooling Surface
180° F.	90° F	85° F.	$22,000
175	90	85	19,200
170	90	85	16,600
180	100	85	17,000
175	100	85	14,700
180	100	80	16,000
175	100	80	12,600

*Read at the Wednesday meeting of the Technical Section of the American Gas Association, assembled in convention at Atlantic City.

Discussion of Table 1

We believe that such data as is contained in Table (1) has many applications, perhaps not fully realized at first glance. For instance, it bears on sizes of pipe lines, sizes of sumps and separators, capacities of exhausters, quantities of cooling water needed, suitable and economical locations of condensing apparatus, relation of relief holders to relative location of condensers, pressure conditions, etc.

of work to be performed is reduced more than 40%. Furthermore, if 170° F. is the actual saturation temperature, the heat to be removed is only 35,363 B. t. u.'s per 1000 cubic feet, or a reduction of more than 60% below the original assumption. It is perfectly apparent that this must have an influence of great importance on investment and on operating conditions and costs.

The importance of Table (2) obviously lies in the

TABLE 1
Compiled by Isbell-Porter Co.
THEORETICAL CONDENSATION
Table Showing Effect of Cooling 550 B.t.u. Water Gas
Based on 1000 C. F. of Saturated Gas at 60° F. & 30" Bar

Temp. F.	Vol. of Orig. M.C.F. Gas with Vapor Cubic Feet	Cont'n Due to Loss of W. Vapor Cu. Ft.	Cont'n of Gas Due to Cool. Cu. Ft.	Vapor in Expanded Humid Gas Lbs.	Sensible Heat in Dry Gas B.t.u.	Heat in Water Vapor B.t.u. Latent	Heat in Water Vapor B.t.u. Sensible	Total Heat in Gas and Water Vapor B.t.u.'s
200	5710	4440	270	169.9	2863	166,157	28514	197,534
190	3390	2140	250	82.9	2660	81,518	13059	97,237
180	2470	1240	230	49.2	2455	48,754	7266	58,475
170	2050	840	210	33.1	2249	32,948	4540	39,737
160	1735	544	191	22.5	2045	22,521	2852	27,418
150	1550	377	173	16.0	1840	16,113	1865	19,818
140	1430	277	153	11.6	1615	11,793	1235	14,643
130	1285	150	135	8.2	1431	8,339	778	10,548
120	1245	130	115	6.1	1227	6,275	515	8,017
110	1200	105	95	4.5	1022	4,647	329	5,998
100	1138	61	77	3.24	818	3,359	197	4,374
95	1110	42	68	2.74	715	2,847	150	3,712
90	1093	35	58	2.33	613	2,424	112	3,149
85	1075	27	48	1.94	511	2,054	81	2,646
80	1059	20	39	1.66	409	1,740	57	2,206
75	1047	18	29	1.41	306	1,483	38	1,827
70	1030	11	19	1.18	204	1,246	21	1,471
65	1015	7	8	.99	102	1,049	10	1,161
60	1000	—	—	.83	—	878	—	878

Notes:
1. Heat removed from tar and oils not included above.
2. Heat in gas due to water vapor is subject to correction from conditions other than saturation.
3. Sensible heat of vapor removed in drip; balance by cooling water and radiation, etc.

Importance of Saturation Temperature

However, within the limits of the plans of the committee it emphasizes the importance of having a knowledge of the saturation temperature to be met in any specific instance. Suppose you are planning a condensing system for a 1,000,000 cubic foot coal gas plant. Assume that the primary condenser is to be built to cool the gas to 100° F. If you take 190° F. as the inlet temperature, and assume the gas is saturated at that temperature, you will note that 92,863 B. t. u.'s must be removed from every 1000 cubic feet. If, however, the gas is saturated at 180° F. instead of 190° F. there are only 54,101 B. t. u.'s per 1000 cubic feet to be removed. That is, the amount

significant relationship between the saturation temperature and the tangible item of investment costs. For instance, on a ten million cubic foot plant.

Saturation Temperature and Investment Cost

(1) If the saturation temperature is 175° instead of 180° an investment cost of $2,800 is saved, whereas, if it is 170° instead of 180° an investment cost of $4,400 can be saved.

(2) If the outlet temperature can be allowed to stand at 100° instead of 90°, a saving of approximately $5,000 can be effected.

(3) If the cooling water temperature is 80° instead of 85° a still further economy of from $6,000 to $9,400 is possible.

Before leaving this table your attention is called to other items which bear close watching.

(1) The outlet temperature desired. Not the difference in cooling surface in terms of dollars between a required outlet temperature of 90° and 100°.

(2) The temperature of the cooling water.

In northern latitudes where water temperatures and atmospheric temperatures vary through wide ranges, it is, of course, necessary to build for maximum temperature conditions, such as maximum temperature of the available cooling water. If 80° is a safe figure note the money wasted by adding 5° as a further safety factor.

Mean Temperature Differences Used in Calculation

Before leaving these considerations, there is one other phase of the condensing problem, which is, we believe, generally overlooked. That is, the functions performed by a condensing system are not to be calculated from average temperature differences, but from mean temperature differences. Table (3) was prepared from Hausbrand's Formula.

The mathematics of the formula whereby the values in Table 3 were calculated may be found in Hausbrand's text book. To illustrate the use of the table, let us assume the following example:

Tubular Condenser

A tubular condenser is operating under the following conditions:

Inlet gas temperature	150° F.
Outlet gas temperature	100° F.
Inlet cooling water temperature	80° F.
Outlet cooling water temperature	140° F.

Max. temperature difference (T a)
150° — 80° = 70° F.

Min. temperature difference (T e)
150° —140° = 10° F.

$$\frac{Te}{Ta} = \frac{10}{70} = 0.14$$

By reference to table 3, it is seen that when the ratio between minimum temperature difference and maximum temperature difference is 0.14, the mean temperature difference is 0.440 for each degree of maximum temperature difference. The maximum temperature difference in this case is 70° F., so the mean temperature difference is:

$$70 \times 0.44 = 30.8° \text{ F.}$$

Now if the average temperature difference has been taken as $\frac{70 \times 10}{2} = 40°$ whatever condensing problem was being worked out would have been based on a temperature head nearly 10° higher than the correct one, and the results would have been in error by 33%.

It has not been possible this year to inaugurate any considerable amount of plant tests or research work bearing on condensing problems and conducted along carefully standardized lines. However, some doubt has been expressed as to whether there is any real difference between the actual temperature at the outlet of the hydraulic main or wash box and the saturation temperature at the same point. The simple expedient, therefore, was adopted of using a wet and dry bulb thermometer test to determine that point and the following results are submitted:

Test No. 1—Vapor Content of Manufactured Gas

The tests were taken at the wash box of the water gas set and at the takeoff just above the hydraulic main. The method used was that of the wet and dry bulb thermometer. One thermometer bulb was covered with wicking kept wet by having one end

TABLE 3
VALUES FOR MEAN TEMPERATURE DIFFERENCE
Tm=Mean Temperature Difference.
Ta=Largest Temperature Difference.
Te=Smallest Temperature Difference.

Te/Ta	Tm for Ta=1	Te/Ta	Tm for Ta=1	Te/Ta	Tm for Ta=1	Te/Ta	Tm for Ta=1
.0025	.166	.11	.404	.23	.526	.75	.872
.005	.188	.12	.418	.24	.535	.80	.897
.01	.215	.13	.430	.25	.544	.85	.921
.02	.251	.14	.440	.30	.583	.90	.953
.03	.277	.15	.451	.35	.624	.95	.982
.04	.298	.16	.461	.40	.658	1.00	1.000
.05	.317	.17	.466	.45	.693		
.06	.335	.18	.478	.50	.724		
.07	.352	.19	.489	.55	.756		
.08	.368	.20	.500	.60	.786		
.09	.378	.21	.509	.65	.816		
.10	.391	.22	.518	.70	.843		

(Continued on Page 578)

As The Journal Views It

NEW PUBLICITY AGENTS

The American Gas Industry as a whole is sold on the publicity idea. It recognizes that the surest way in which to gain the confidence of the public, to circumvent the unfriendly efforts of individuals, swayed by ulterior motives, to counteract the reports that are constantly being circulated to the discredit and harm of the industry, is to engage in extensive and well-planned publicity work, to bring the real facts to the attention of the gas consumers and the people in general.

There are many ways in which this can be done. Advertising in proper media is of course productive of important and far-reaching results. Personal contact between the public and employees of the gas company also plays a significant role in promoting better public relations. Talks before political bodies and public institutions, interviews and specially written stories for newspaper publication are similarly productive of good results.

However, three other methods of reaching the public ear or eye, which are of comparatively recent origin and which have not been used to any considerable extent by the gas companies, demand our attention. These are the radio, the moving picture and the appeal to school children through still pictures.

A number of library organizations throughout the country have been using pictures to tell certain stories to school children. These picture sets are borrowed by the school and used in the class rooms. Industrial as well as nature stories and the like have been told in this way. Cannot the gas company tell its story in a similar manner? A vivid impression can be created on the mind of the school child, which will be retained when the child becomes an adult. This impression will be bound to be friendly towards the public utility, if the work is carried on in a proper fashion. It is understood that certain gas companies and other public utilities have been taking advantage of this opportunity and are securing good results. There does not appear to be any important reason why this new publicity agent should not be generally used throughout the gas industry.

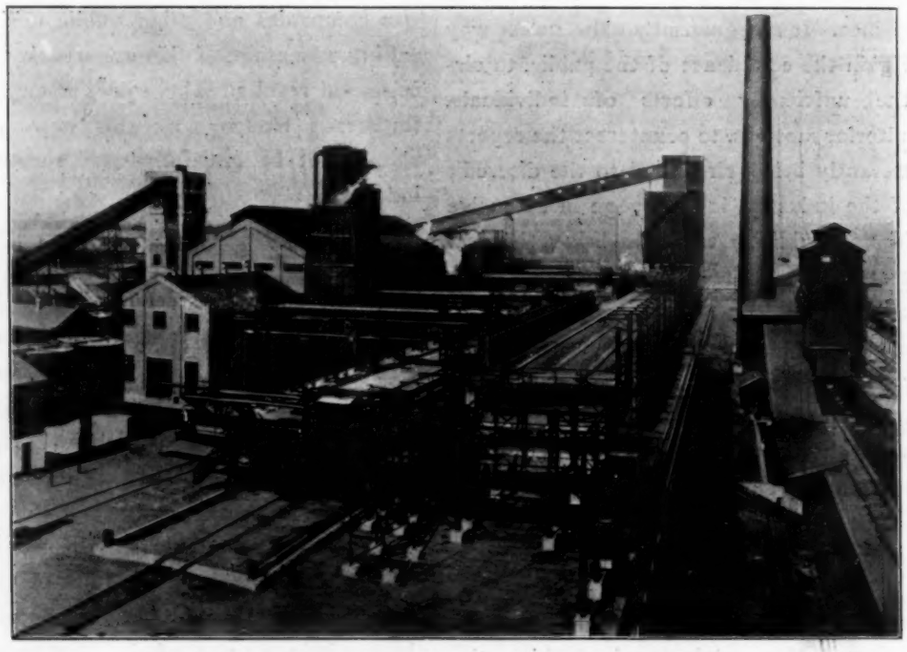
Moving pictures have also been used by different industries to convey their message to the public. Thus the story of steel has been told in pictures, likewise the story of rubber, and so on. The appeal to the eye is, under certain conditions, even more impelling than that to the ear. Certainly people like to see interesting moving pictures. The gas industry has also used moving pictures to show the public how gas is made, and to give it some idea of what gas service means. This is perhaps not new to many gas men, but a more general use of moving pictures for this purpose would certainly be of advantage to the gas industry as a whole. Not only have moving pictures been shown to children in schools, but to adults as well, and their message always carries weight.

The last publicity agent which attracts our attention is the radio. There is, perhaps, no more potent means of reaching the general public at the present time in so attractive and interesting a manner as by the radio. Many industries have made use of it, and the gas industry has also used the radio in one city at least with excellent results. The gas story has been told over the radio and the returns have been really remarkable; in fact, the volume of letters received was so great that a special department had to be organized to take care of them. The use of the radio by the gas company should be adopted throughout the country. It is an important link in the publicity chain and its appeal is universal.

Preparing for the Future

Utica Gas and Electric Company building large new plant

While this company has an ample supply to meet present and near future needs, officers and heads of the various departments realize it is only a matter of a short time before the output will be insufficient, and always peeping into the future and confident that the growth of Utica and the surrounding territory will triple its present size in the next decade or two, the new plant is deemed a necessity and the contract for its construction has just been awarded to the Koppers Company of Pittsburgh, Pa.



How the New Plant Will Look When Completed

Daily Capacity

The first new unit will have a daily capacity of 3,000,000 cubic feet of gas, while the present water gas plant of 5,000,000 cubic feet capacity will be used in manufacturing the excess above this figure and for taking care of the peak loads and irregularities in the gas demand.

The new plant is designed for operation with the least amount of labor possible and the most modern devices for handling large quantities of materials, at the same time, insuring for Utica a larger reserve capacity for making gas.

Coal for the manufacture of the gas will be brought in by freight cars and dumped into a track hopper, from which a belt conveyor will carry it at the rate of 75 tons per hour to the crushing plant. Here the large lumps will be broken up and all the tramp iron and slate removed and then passed through a pulverizer which will crush the coal so that 30 per cent will pass through a ⅛-inch screen.

After leaving the crushing plant the coal will be carried by a belt conveyor to a large storage bin located above the ovens and will be ready for use.

The Ovens

The coke ovens, an assembly of 21 units, each consisting of a large vertical oven 13 inches wide, 16 feet 10 inches high and 23 feet long, are heated by producer gas burned in rectangular flues arranged on each side of the ovens. Doors are located on each end of the ovens, two charging holes on the top and one gas offtake.

Coal is fed into the top of the oven with the side doors closed and then the oven is completely sealed from the air and the gas is driven off by the heat into a gas main. This operation requires about 12 hours, when the coal is turned completely into coke and all the gas or volatile matter driven off. The side doors are then removed and a large machine, called a coke pusher, operating on one side of the oven, pushes the complete charge of coke out of the opposite door into a coke car. This same operation is repeated in each oven every 12 hours.

NEW FIRE DRILL TOWER INCLUDES SPECIAL PROVISION FOR TEACHING FIREMEN HOW TO OPEN AND CLOSE GAS METERS

A novel and interesting feature of the new fire drill tower recently completed in San Francisco is a concrete room under the sidewalk in which is placed a gas meter. There is a steel ladder leading to the basement room with typical sidewalk elevator doors permitting the firemen to gain access to the room in which the gas meter is placed. Through this special arrangement the firemen are taught the proper method of entering a basement room and are taught how to open and close the gas meter. Gas is actually piped to the fire tower, so that it can be used if necessary. On the outside of the fire tower,

there is a gas shut-off valve by means of which the gas can be shut off from the sidewalk. The firemen are also taught the proper method of reading gas meters.

The building cost approximately $80,000. Fire Chief Thomas Murphy has visited practically every city of importance in America for the purpose of obtaining ideas for the fire drill tower, and the gas meter arrangement was one of the ideas that he has incorporated.

DISTILLATION OF COAL

By Rene Masse and Auguste Baril

This is the title of a new book published in French by two gas men who are well known in their own country. The book commences with a short historical review of the subject, and then the authors immediately proceed to the study of the problem of the supply of coal, its distribution and storing. They also pay some attention to the classification of coal and its analysis. However, by far the greater part of the work is devoted to the subject of distillation. Problems of heat and distillation are treated in this part of the book along theoretical lines and the principles and laws on which practical operation is based are formulated.

The last section of the book is devoted to the study of the various gases derived from the distillation of coal, such as water gas, coke oven gas, etc.

CASH VALUE OF PUBLIC UTILITY

(Continued from Page 568)

doing a combined electric lighting and gas business.

Gas revenue times four (4)	$ 4,384,196.00
Electric revenue times three (3)	6,767,789.00
Total gross revenue value	$11,151,985.00
Net earnings capitalized at 7%	13,343,014.00
Rate base Dec. 31, 1922	11,149,698.00
Market value of securities	11,266,540.00
Average value	11,727,809.00
Average value times 80%	9,382,247.00

It will be noted from the above that the gross revenue value agrees within $1,300 of the rate base in this instance. The net earnings value in this case was the largest. This net earnings value could not, however, have been taken as the only element of actual cash value, inasmuch as this utility earned in 1922 more than the commission considered a reasonable return on the rate base, and, therefore, had the capitalization of net earnings alone been used, the utility would have been assessed far in excess of what any purchaser would have paid for the property under the circumstances.

PRESENTING GAS NEWS TO PUBLIC

(Continued from Page 571)

formed think "small users" and "toiling masses" are synonymous. There are the interesting uses of gas in the arts and the industries—full of colorful material.

Abundant profit to the industry—money profit—will follow utilization of these opportunities, backed by company use of advertising as practically all modern and successful businesses use it. That is as certain as death or taxes.

Consistent use by member companies of the slogan, as recommended by the Manufacturers Section and adopted by the association—"If it's done with heat, you can do it better with gas"—is urged. The value of a slogan grows with use of it. This one has proved itself where consistently used.

PRODUCTION OF BITUMINOUS COAL

First Ten Months, in Thousand Net Tons

	1923	1922	1921	1920	1919	1918
Jan..	50,178	37,489	41,148	49,748	42,193	42,227
Feb..	42,160	40,856	31,524	41,055	32,103	43,777
Mar..	46,802	49,976	31,054	47,850	34,293	48,113
Apr..	42,564	16,000	28,154	38,764	32,712	46,041
May..	46,076	20,601	34,057	39,841	38,186	50,443
June.	45,490	22,624	34,635	46,095	37,685	51,138
July..	45,126	17,147	31,047	45,988	43,425	54,971
Aug..	48,864	27,538	35,291	49,974	43,613	55,114
Sept..	46,216	39,413	35,870	50,241	48,209	51,183
Oct...	*49,200	44,907	44,687	53,278	57,200	52,300
T'tl	*462,676	316,551	347,467	462,834	409,619	495,307

*Estimated—subject to revision.

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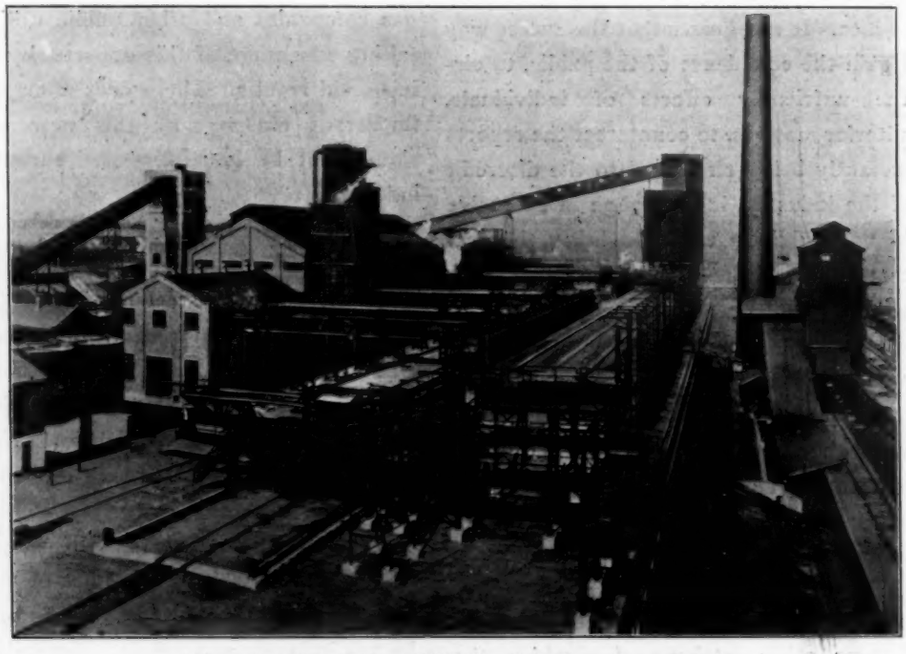

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Feb..	42,160	40,856	31,524	41,055	32,103	43,777
Mar..	46,802	49,976	31,054	47,850	34,293	48,113
Apr..	42,564	16,000	28,154	38,764	32,712	46,041
May..	46,076	20,601	34,057	39,841	38,186	50,443
June.	45,490	22,624	34,635	46,095	37,685	51,138
July..	45,126	17,147	31,047	45,988	43,425	54,971
Aug..	48,864	27,538	35,291	49,974	43,613	55,114
Sept..	46,216	39,413	35,870	50,241	48,209	51,183
Oct...	*49,200	44,907	44,687	53,278	57,200	52,300
T'tl	*462,676	316,551	347,467	462,834	409,619	495,307

*Estimated—subject to revision.

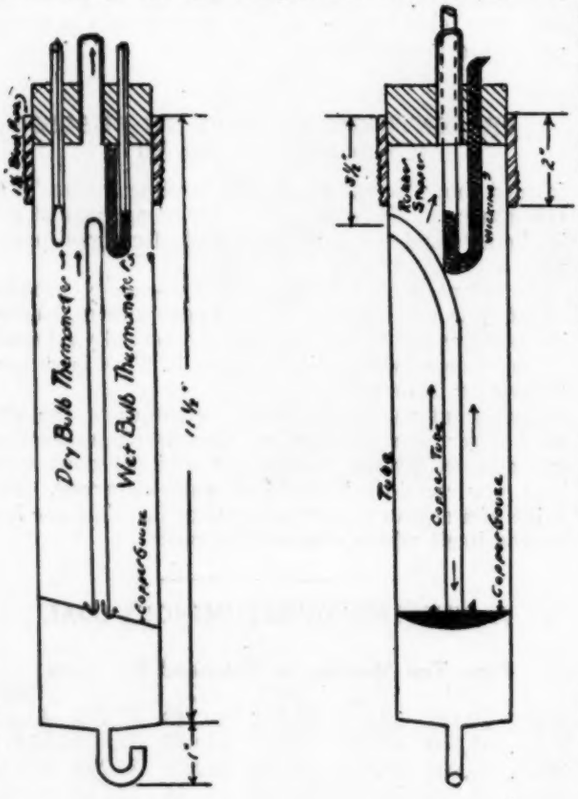
CONDENSING AND SCRUBBING

(Continued from Page 574)

dipped in water. The other thermometer was left exposed. The gases passed over the two thermometer bulbs, and if the gas was not saturated with water more would be taken up from the wicking around the thermometer bulb. Because of this evaporation, the bulb would be cooled, thus creating a temperature difference between the wet and dry bulb thermometers. These temperature differences, at various tmperatures, have been tabulated with the corresponding percentages of saturation. These tables were consulted in finding the percentage saturated.

Description of Apparatus

The apparatus, as seen from the drawing, sets in the gas stream, thus eliminating any jacketing or corrections for temperature changes. The gas entered through the side and just above the middle. It



Apparatus for Determining the Moisture Content of Gases

then passed down and then back up, passing as shown through the screen and around the thermometers before leaving the apparatus. Cotton was used, at first, around the tube to remove the tar and tar vapors. This, however, became saturated with water and thus gave the gas a different degree of saturation than it had originally. By removing the cotton and repeating the process, there was found to be an additional one degree temperature difference between the wet and dry bulb thermometers.

The screen used was of very fine mesh, such as is used to remove any drops of water found in gasoline. It was also put in the apparatus at an angle so that any water, that should happen to accumulate, would drain to one side and not remain spread over the surface of the screen. The drip in the bottom permitted the separated tar and water to drain out.

Water Gas Determinations

When the determinations were made of the water gas set, sufficient pressure was on the wash box to force the gas through the apparatus. When working with the coal gas, the gas had to be drawn through the apparatus because of the vacuum carried on the hydraulic and foul mains.

In the water gas determinations, there were some fluctuations in temperatures between those of the steam run, purge, and blow run, also blast. However, on the steam run, a dynamic equilibrium was soon reached and maintained until the purge. The tests were taken covering two periods of two hours each. The average temperature difference was three degrees Fahrenheit.

The percentage humidity was obtained from a curve plotted from the previously mentioned tables, the same being issued by the U. S. Weather Bureau. Plotting the curve for three degrees temperature difference, the percentage saturation was found to be 92.51%.

Coal Gas Determinations

The determinations made on the coal gas covered four different periods. An equilibrium was soon attained and held. The temperature difference was practically constant, averaging 7 degrees F. From the curve, plotted for this temperature difference, the humidity was found to be 84.65% saturation.

Test No. 2—Report on Cooling and Condensing

1. Coal Gas Tests

Mr. Benesh's test was merely a wet and dry bulb determination with a means for obtaining a constant dry bulb temperature. With coke oven gas, the gas temperature at the entrance of the primary coolers is approximately constant over a period of several minutes, and a wet bulb test, simply made by putting wet and dry bulbs in the main seemed to work very well, in spite of the tar. The tests reported below check fairly well with the primary cooler test given, in which the moisture content of the gas was calculated from another angle .

Cooler Test

A test was run on the primary coolers some time ago. In this test, the total heat absorbed by the water was found and it was possible then to calcu-

late the only unknown, which was the amount of liquor condensed, and, in turn, the saturation temperature of the gas, which was found to be nearly that of the tar flushing. Accordingly, the gas was considered saturated at this temperature, and heat balances made for the two tests run.

The points brought out by these tests were: First—the gas was saturated at a temperature lower than the one at which it entered the coolers. Second—The saturation temperature was about the same as the one found by the wet and dry bulb method made some time later, though under somewhat different operating conditions as to quantities of gas, etc. Third—About 95% of the heat, absorbed by the cooling water, was due to the cooling and condensing of liquor and tar. Less than 5% was due to the loss in sensible heat of the dry gas itself.

Producer Gas Tests

(a) By calcium chloride absorption.

Last fall a number of tests were run on the moisture content of the gas leaving the waste heat boilers and entering the washer coolers. Some of these are given herewith.,

Test No.	Pounds Water per cu. ft. Gas at 60-30	Sat. Temp. °F.
1	.0038	105
2	.0033	100.5
3	.0037	104
4	.0028	95
5	.0030	97

This content checked with the content calculated from moisture on the fuel and undecomposed steam content of the gas. These tests are of interest as checks to the wet and dry bulb tests.

(b) Tests with wet and dry bulb thermometers.

In these tests, an air cooled pipe was used instead of a steam jacket as outlined by Mr. Benesh. The time being short, we were not able to build the device described. The results obtained by the wet and dry bulbs, used with an air cooled pipe, seemed very consistent.

The average moisture content, based on one minute readings, taken for an hour, was .003 lbs./cu. ft. gas at 60-30, which, considering the moisture content of our fuel, etc., seems correct.

Test No. 3

On the outlet of the hydraulic main, we obtained a wet bulb reading of 116 degrees and a dry bulb reading of 135 degrees which, according to our tables, gives a saturation of 55%.

On the outlet of the water gas wash box, we did not obtain any difference between the wet and dry bulb readings, which we believe was due to the high temperature of the gas at this point, which was 180 degrees during the run and 160 degrees during the blow. The steam consumption on our water gas set, during the time we attempted to make the test, was 24¼ pounds per minute. The above tests were made by inserting the dry bulb thermometer through a tap in the main and, as soon as the temperature reached the maximum point, the dry bulb thermometer was removed and the wet bulb inserted in its place. It is our opinion that this method is very crude and the results cannot be relied upon for accuracy.

Test No. 4

The tests were taken in the coal gas plant at a point where the hydraulic mains, one for a stack of ten benches and one for a stack of five, unite. At this point there are two spray tanks, and, of course, this would affect the results. Our tests showed practically complete saturation. The test in the water gas plant was taken at the off-take of the wash box. These tests also showed complete saturation. The psychrometer tests made are tabulated below.

Hydraulic Main Outlet

Date	Dry Bulb	Wet Bulb
6/1/23	148 deg. F.	148 deg. F.
2	152	152
4	149	150
5	150	148
8	152	152
9	149	150
12	155	152
13	149	149
15	152	150

Wash Box—Water Gas Plant

Date	Dry Bulb	Wet Bulb
6/1/23	178 deg. F.	177 deg. F.
2	193	192
4	190	190
5	185	182
8	194	193
9	194	194
12	188	186
13	175	176
15	190	190

Test No. 5

Saturation Test of Water Gas.

Gas taken at outlet of wash box.

Data

Volume of gas passed at 35 deg. C. or 95 deg. F. 745.5 mm. Hg. equals 7 cu. ft.

Weight of moisture in calcium chloride tubes (3) equals 1.02 gm.

Calculations

Weight of moisture collected per cu. ft. of gas passed

equals $\frac{1.02}{7}$ equals .1457 gm.

Partial pressure of H_2O vapor at 35 deg. C. or 95° F. equals 41.784.

Volume of H_2O vapor at 1 cu. ft. saturated air at test cond.

equals $1 \times \frac{41.784}{745.5}$ equals .056 cu. ft.

1 cu. ft. H_2O vapor at 0 deg. C. or 32° F., 760 mm. Hg. equals 22.963 gm.

1 cu. ft. H_2O vapor at test conditions.

$$= 22.963 \times \frac{273}{308} \times \frac{745.5}{760} = 19.92 \text{ gm.}$$

Weight of H_2O vapor passed per cu. ft. gas passed, if gas were saturated,

$$\text{equals } \frac{19.92 \times .056}{7} \text{ equals } .1595 \text{ gm.}$$

Saturation of gas

$$\text{equals } \frac{.1457}{.1595} \times 100 \text{ equals } 91.3\%.$$

Test No. υ

Saturation Test of Coal Gas.

Gas taken at off take of hydraulic main.

Data

Volume of gas passed at 40 deg. C. or 104° F., 742.95 mm. Hg. equals 12 cu. ft.

Weight of moisture in calcium chloride tubes (3) equals 11,784 gm.

Theory of Calculations

Saturation of gas determined by ratio of weight of collected moisture per cu. ft. of gas passed under test conditions to the weight of water vapor in 1 cu. ft. of saturated air calculated to the same conditions.

Calculations

Weight of moisture collected per cu. ft. of gas passed

$$\text{equals } \frac{1.1784}{12} \text{ equals } .0982 \text{ gm.}$$

Partial pressure of water vapor at 40 deg. C. or 104° F. equals 54,865 mm. Hg.

Volume of H_2O vapor in 1 cu. ft. of saturated air at test cond.

$$\text{equals } \frac{1 \times 54.865}{742.95} \text{ equals } 0.885 \text{ cu. ft.}$$

1 cu. ft. H_2O at test cond.

$$\text{equals } 22.963 \times \frac{273}{313} \times \frac{752.95}{760}$$

Weight of H_2O vapor passed per cu. ft. gas passed if gas were saturated.

$$\frac{19.55 \times 0.885}{12} \text{ equals } .144 \text{ gm.}$$

Saturation of gas equals

$$\frac{.0982}{144} \times 100 \text{ equals } 68.2\%$$

Note: These calculations based on saturation of air.

Conclusions

The Committee is fully aware of the inadequacy of these tests and the possible criticisms of the methods used. As has previously been stated, no time was available for working out an acceptable standard method for conducting such tests. We believe, however, that they are illustrative.

It may be implied from the tests that the results shown represent stable or constant conditions at the plants where the tests were conducted. This is not necessarily the case, though for the purposes of our argument they may be so taken, for they clearly show that in certain instances, and under what we may assume to be usual operating conditions at the plants where the tests were run, complete saturation of the gas does not exist at the outlet of the wash box or the foul main. This condition and its constancy is what the individual operator is concerned with in considering his condensing equipment.

It is not infrequently the case that direct attempts are made to saturate the gas at the wash box or foul main. Whatever this accomplishes, it is well to bear in mind the relation of the scheme to the condensing problem.

The addition of water to the gas results in a lowering of gas temperature by the transfer of sensible heat in the gas to latent heat in the evaporated moisture, the total heat being still contained in the saturated gas. This cuts down the mean temperature difference between gas and outside air and reduces cooling by radiation which, as far as it is practicable, costs nothing. Further, it reduces the available mean temperature difference between gas and cooling water in the primary condenser, thus making it necessary to furnish more surface than would have been required had relatively hot dry gas been allowed to reach the condenser.

The above test is so simple and obvious, yet seemed to give such consistent results that we are wondering if there is not some joker in it which we have not discovered.

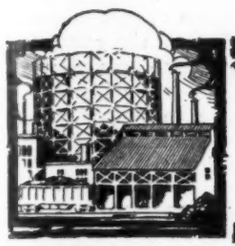
COKE OVEN ACCIDENTS IN THE UNITED STATES IN 1922

The Bureau of Mines has just issued a bulletin entitled "Technical Paper 349" on the above subject, compiled by William W. Adams.

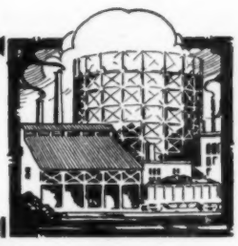
The report covers in detail the accidents at both beehive and by-product ovens during the calendar year 1922. It is stated in the introductory remarks that there was a lower injury rate in 1922 than in 1921. However, the fatality rate of by-product ovens was greater than in 1921, while in the beehive ovens it was lower.

The Bureau of Mines received reports from companies operating 26,867 beehive ovens and 7,249 by-product ovens. The total number of men employed at both classes of ovens was reported as 19,278, which is an increase of 19 per cent over the previous year. The figures also show that the average work days per man during the year was 284, as compared with 257 in the previous year, 1921.

Copy of this bulletin may be obtained from the Bureau of Mines, or from the Superintendent of Documents, on the payment of 5 cents.



NEWS OF THE GAS INDUSTRY



"Own Your Home Exposition" to Have Gas Display

"Manufacturers and dealers of gas equipment and appliances are beginning to realize that they must support any approved method to stimulate home building, if a large amount of sales are to be made," said C. A. Luther, assistant general manager of the People's Gas Stores and chairman of the Gas Appliance Committee of the Fourth Annual Chicago "Own Your Home" Exposition, speaking before a meeting of his committee in his office, attended by fifteen manufacturers and representatives of manufacturers on November 13.

"The people attending the 'Own Your Home' Exposition come prepared to see the most modern equipment for the homes they are intending to build or the homes they already own or rent. It is then up to the men in the gas industry to show the importance of gas as a utility and its modern uses which can make the home comfortable and attractive."

This committee will supervise the gas section at the exposition and permit no firm to exhibit unless approved by them. Each piece of equipment and each appliance will be shown in its proper setting and assignments are being made with this in view.

The members of the committee include: C. E. Bartenbach, A. B. Stove Company; J. C. Bowery, Hungerford & Bowery Company; Reid Cameron, Lovekin Water Heater Company; E. V. Dailey, James B. Clow & Sons; H. O. Dummett, Humphrey Co.; W. A. Framke, Reliable Stove Co.; C. O. Frary, General Appliance Sales Corporation; Harry Kline, George D. Roper Co.; Fred H. Ricks, Eureka Water Heater Co.; R. V. Prather, Illinois Gas Association; J. Ratcliffe, Michigan Stove Co.; W. A. Smith, Cribben & Sexton Co.; and A. I. Wallace, General Gas Light Co.

The exposition will be held in the Coliseum, March 22 to 29, 1924.

Adirondack Report for Year Reflects Business Expansion in District

Increased business development in the Capitol District is indicated through increases in use of light and power announced in a report by the Adirondack Light and Power Corporation of earnings for October and for the year.

"The gross revenue of the corporation for the month of October of $618,227.43 showed an increase of 20.65 per cent compared with October, 1922," the announcement said. Its gross income of $134,397.85 and its net income of $61,779.63 increased 36.28 per cent and 441.77 per cent, respectively, by comparison with the same month in 1922.

"For the ten months of 1923, the gross revenue was $5,611,091.15, compared with $4,562,301.19 for the same period of 1922, an increase of $1,048,789.96, or 23.52 per cent. Gross income was $1,515,350.92 and net income was $579,062.22, increases of 7.36 per cent and 6.26 per cent, respectively, over the ten months of 1922.

"Gross revenue for the twelve months ended October 31, 1923, was $6,816,630.68, compared with $5,511,266.95 for the same period in 1922, an increase of $1,305,363.73, or 23.68 per cent, in the period. Gross income was $1,820,387.89 and net income was $700,101.95. After paying preferred stock dividends and making all surplus adjustments during this period the balance of net income was at the rate of three-quarters of 1 per cent per annum on the common stock outstanding at the end of the period."

COMPROMISE GAS RATE IS ACCEPTED

Consumers Agree to New Schedule Offered by the Company

Little Rock, Ark.—The executive committee of the Arkansas Gas Consumers Association and others interested in the proposed gas rate schedule, at a meeting in the Mayor's office at the City Hall agreed to the proposed compromise rate schedule, which will end the long-pending controversy. Members of the Public Utilities Committee of the local City Council agreed to recommend to the Council approval of the recommendations and passage of the necessary ordinance.

According to the agreement, the Little Rock company will charge 55 cents per 1,000 cubic feet and a 50-cent monthly meter charge. Industrial users will pay the domestic rate of 55 cents for all gas up to 200,000 cubic feet per month and 25 cents per 1,000 feet in excess of that quantity. For industries using rotary kilns and annealing guns, such as the bauxite companies, the rates will be 30 cents per 1,000 cubic feet.

J. R. Munce, vice-president and general manager of the Arkansas Natural Gas Company, expressed satisfaction at the result of the conference.

H. L. Toney, Mayor of Pine Bluff and president of the gas consumers' organization; John F. Fowler, of the American Bauxite Company; J. F. Loughborough, attorney for the consumers, and Ashley Cockrill, attorney for the Little Rock Gas and Fuel Company, were elated over the amicable settlement of the controversy.

Engineering Company Organized

The Ludlum Engineering Company, with offices at No. 2 Rector street, New York City, has just been organized to engage in general consulting, designing and supervising engineering work, including placer mining, steam power and gas plants.

The personnel of the company is made up of engineers who have specialized in their respective branches, which will insure efficient service, not only in the making of investigations and preparation of reports, but also in the designing of complete plants and the supervision of their construction and operation. The company is further prepared to assist in financing mining propositions if its investigation results in a favorable report. E. W. Steinmueller is general manager of the new company.

New Installation

Buffalo, N. Y.—Construction will begin immediately on a steel coal trestle for the Iroquois Gas Corporation of Buffalo. The trestle will be located at 50 Bradley street, near Dart street, and the cost is estimated at $35,000.

New Gas Well

Silver Creek, N. Y.—With a roar that could be heard for half a mile, a new gas well came in on the Barber farm near Silver Creek. Initial flow of the well is estimated at 3,000,000 cubic feet a day, the largest ever brought in in this immediate vicinity.

Drillers went 1,000 feet through rock before they reached the gas. The well is owned by the Dorothy Gas Company of Dunkirk and the fuel will be sold to the Republic Light, Heat and Fuel Company, which will distribute it in Dunkirk and vicinity. The consumer's price is 50 cents a thousand.

Two years ago a similar well was struck in the Arkwright field. Gas from this well is being sold in Buffalo.

Rate Down in Salem

Salem, Mass.—A voluntary reduction of 5 cents per 1,000 cubic feet in the price of gas, making it $1.50 net, was announced by the Salem Gas Company recently.

A. O. Eberhart Elected President Radiant Heat Corp. of America

At a recent meeting of the directors of the Radiant Heat Corporation of America, New York, A. O. Eberhart was elected president in place of F. P. Toombs, who resigned. Mr. Eberhart is a man of wide experience, having been connected with a large number of business enterprises in the past,

and from now on will devote practically all his time and energy in the interests of the Radiant Heat Corporation, with which he has been connected almost from its inception.

Mr. Toombs leaves with the good will of all who knew of his efficient work in building up the company, and will immediately engage in another business enterprise.

New Plant Ready Shortly

Hibbing, Minn.—Hibbing's $105,000 gas plant will be put into operation soon, it was learned at the water and light department office, after a long delay because of the non-arrival of needed machinery. The old plant will be shut down and used henceforth only in a case of emergency.

The new plant will manufacture water gas, which is for all practical purposes to excel that manufactured by the old plant. The cost of production will be less, it was said, because less labor and fuel will be needed.

Thomas Fleming, accountant for the water and light department, said that it may be possible to reduce the cost of gas to the consumer soon after the inauguration of the new service.

Not only is the new plant capable of furnishing all the consumers of gas with better gas, but the plant will be capable of providing every residence in the city with gas, no matter how large the city grows in the future.

Authorizes Change in Stock Shares

Boston, Mass.—The Public Utilities Commission authorized a change from $100 to $25 in the par value of the capital stock of the Malden Electric Company, the Malden and Melrose Gas Light Company, the Suburban Gas and Electric Company and the Eastern Massachusetts Electric Company.

The capital stock of the companies at present is as follows: Malden Electric Company, $1,602,000; Malden and Melrose Gas Light Company, $2,732,000; Suburban Gas and Electric Company, $1,251,700; and Eastern Massachusetts Electric Company, $250,000.

In each case, the commission states in its decision, the approval is given on condition that the aggregate par value of the outstanding shares of the capital stock shall not be increased by the change in the par value thereof.

May Sell Bonds

Mobile, Ala.—The Mobile Gas Company, in a decision announced by the public service commission at Montgomery, is allowed to sell $725,000 worth of par value 7 per cent first mortgage bonds. Sale of the bonds is provisional on their earning the company not less than 90 per cent, plus accrued interest. The decision also specifies that the company must receive 95 per cent of the purchase price of the bonds, the proceeds of which are to be used in paying off bonds maturing January 1, 1924, and on the mortgage covering the company's office building.

The gas company is also allowed, in the decision of the commission, to issue to the Metropolitan Company $500,000 of its 8 per cent cumulative preferred stock in payment of a like amount of indebtedness.

Permission to issue and sell an additional $238,000 worth of par value 7 per cent first mortgage bonds was denied the company.

Consolidated Gas Company to Increase Common Stock

Additional Capital to Reimburse Treasury for Expenditures on Improvements to Plant

On the adjournment of the Board of Trustees of the Consolidated Gas Company of New York on Tuesday, November 13, the following statement was issued:

It is the opinion of the Board of Trustees of the Consolidated Gas Company of New York, as expressed in a resolution adopted today, that it is advisable to increase the number of shares of common stock which this company may issue, from 3,000,000 shares, the number heretofore authorized, to 3,600,000 shares, for the purpose of providing additional capital for the discharge of this company's obligations and for the reimbursement of its treasury for moneys expended out of income for the acquisition of property and for the construction and extension of its plants and distributing system and those of its affiliated gas and electric companies.

The board has recommended such increase to the holders of this company's common stock, and also recommended that the additional shares be offered to holders of common stock of record at the close of business at 12 o'clock, noon, on Saturday, December 8, 1923, for subscription, at the price of $50 a share, at the rate of one new share for every five shares owned by them.

A special meeting of the holders of this company's common stock has been called, to be held on Monday, December 3, 1923, at 12 o'clock, noon, for the purpose of considering such increase in the number of shares of common stock and, if such proposed increase be approved, of authorizing the same and of providing that the additional shares be offered to stockholders for subscription.

The constantly increasing demand for gas and electric service, resulting from the continuous growth and expansion of the City of New York, has, during the past year, rendered necessary heavy capital expenditures for the construction and extension of the plants and distributing system of the company and its affiliated gas and electric companies. These expenditures, nearly 85 per cent of which have been for extensions of the electric properties, have thus far been met, to a considerable extent, by temporary loans; and it is now proposed to pay off these loans by the issue and sale of additional common stock, instead of issuing bonds or other obligations. The company has no bonded indebtedness; and, under present conditions, the board of trustees are of the opinion that the opportunity to finance the capital requirements of the company should be given to the stockholders.

Subject to approval by the stockholders, it is proposed that payments upon subscriptions for the new stock shall be called for in three instalments, the first, of 40 per cent, payable on December 28, 1923, the second, of 30 per cent, on March 15, 1924, and the third, of 30 per cent, on June 14, 1924, with the privilege of anticipating any of such payments. Warrants defining their rights will be mailed to holders of common stock as soon as practicable after the stockholders meeting has been held.

New Gas Well

The Republic Light, Heat & Power Company has a new producing well in the township of Sheridan, near Dunkirk, N. Y., which has an estimated daily flow of 1,500,000 cubic feet of gas.

J. J. McKenna Elected Treasurer of Louisville G. & E. Co.

John J. McKenna, formerly of the auditing department of H. M. Byllesby & Co., has been elected treasurer of the Louisville Gas & Electric Company. Mr. McKenna also is auditor of the company. He succeeds F. F. Martin, who will be attached to the Byllesby auditing department.

Mr. McKenna has been with the Byllesby organization since 1915, when he joined the auditing department of the Minneapolis division of the Northern States Power Company, later being transferred to the Stillwater division of that company. Then he spent about a year in the independent auditing field, leaving that to enter military service in 1917. He served sixteen months with the A. E. F. overseas, being discharged with the rank of first lieutenant, April, 1919.

Shortly afterward he rejoined the Byllesby organization, this time in the auditing department at Chicago. He was appointed auditor of the Louisville Gas & Electric Company in October of the same year. After a year he returned to the auditing department at Chicago, where he remained until being made treasurer of the Louisville company.

To Drill for New Wells in Buffalo

Commissioner Frank C. Perkins, of the Department of Public Affairs, of Buffalo, proposes to drill three more municipal gas wells within the city limits and to deepen one which has already been drilled. He has not asked for an appropriation, but will shortly. Commissioner Perkins is one of the members of the Buffalo City Council and was recently re-elected by the largest majority ever accorded a Councilman under the commission form of government. He has already used $20,000 in drilling two municipal wells, which came in moderately well, and are being used to supply gas for city institutions.

Stock of Kansas Gas and Electric Company Selling Fast

Independence, Kan.—Stock of the Kansas Gas and Electric Company of a par value of more than $135,000 has been subscribed since the opening of the stock campaign four weeks ago, according to W. R. Murrow, the company's district manager.

"We are very much pleased, in fact we are enthusiastic over the way the people all over the territory are subscribing to our offering of 7 per cent cumulative preferred stock," said Mr. Murrow. "A year ago during a similar preferred stock campaign and during the same period of time the subscriptions to our preferred stock amounted to less than $100,000, par value. We do not know how to account for this increase in the amount and the number who have invested this year unless it be due to the fact that we are now able to tell the people positively that the stock is free from city, county and state taxes in Kansas and the dividends are exempt from present normal Federal income tax.

"One reason why the stock is thus tax free to the investor is because the taxes are paid by the company. All the company's property and principal office is located in Kansas. And, by the way, it might be of interest to the people to know that we are paying in Montgomery county this year taxes to the approximate amount of $39,677.51. The total of state, city and county taxes of the company for 1923 will amount to approximately $432,947.73, as compared with $337,101.08 for 1922.

"These tax free features of the stock from the standpoint of the investor doubtless accounts largely for the increase in stock sales this year over last, but there are other reasons. The people generally are beginning to have a better understanding of public utility companies like our light and power company. They are beginning to understand the fundamental differences between a public utility business which is regulated by the state and private businesses which are not regulated.

"In times of adversity, or in hard times, a private business ceases to borrow money, immediately cuts down operating expenses by discharging men, by cutting wages, by refusing to buy unless the price is satisfactory, and, if necessary, it reduces its output or closes up shop and waits for more prosperous times.

"The public utility can do none of these things. It must continue to operate at full blast, regardless of the nature of the times. It must continue to buy materials and supplies required. It must retain its full force of employees, and increase the force as demand for its service increases. It cannot reduce salaries and wages to the same extent as private business. If trained employees were discharged, if inexperienced, cheap labor were employed, if necessary materials and supplies were not at hand, if money were not borrowed to make required additions and extensions, the service would immediately suffer and the patrons would be the first to bitterly complain.

"All these things work for stability in our securities as much as for an uninterrupted service.

"The selling price of our stock is $98 and accrued dividends, which makes a net investment of better than 7 per cent," said Mr. Murrow.

Gas Appliance Co. Is Incorporated

Oakland, Cal.—Articles of incorporation of the Gas Appliance Sales Company have been filed. The incorporators are John H. Eustice, Harry C. Knight, Carl T. Doell, Paul B. Irvin and Charles F. Fisher. The capital stock has been placed at $50,000, with shares at $10 each. The sum of $50 has been subscribed.

Supreme Court Affirms Two Part Rate

Topeka, Kan.—The public utilities commission has received information that the United States Supreme Court has affirmed the commission and the State Supreme Court in the Winfield gas case. The commission ordered establishment of a two-part rate for Winfield and the city appealed from the ruling.

Installs New Apparatus

The Spencer Gas Light Co., of Spencer, Mass., has just completed the installation of a new five-foot gas machinery set, new set of purifying boxes and a station meter. The plant capacity has been increased from 8,000 cu. ft. per hour to 23,000 cu. ft. per hour. The plant, after a few minor improvements, will be modern and up-to-date in every detail.

New Holder Ready

The new 300,000 cu. ft. gas holder has been completed at the gas plant of the Leominster (Mass.) Gas Light Co. The riveters commenced on the holder on June 2 of this year. The foundation was started last fall before the frost set in and the Stacey Mfg. Co. of Cincinnati started to put the holder up this spring. The capacity of the plant has been more than doubled and the needs of the city cared for for many years to come. Leominster now has one of the most complete and best equipped plants of its size in the State of Massachusetts.

Elect Officers

At the regular meeting of the Clinton Gas Light Social Club, Clinton, Mass., the following officers were elected for the ensuing year: President, Harold Robichaud; vice-president, Charles Neeley; secretary and treasurer, William Casey.

To Enlarge Gas Plant

Saranac Lake—Ernest Grubb of New York, who recently purchased the gas plant and franchises at Saranac Lake, will enlarge the plant and extend the system, he announces. He will erect a new holder of 5,000 to 10,000 cu. ft. capacity.

Increases Rate 10 Per Cent

Beaver, Pa.—The Big Beaver Gas Company, furnishing natural gas service in the boroughs of Darlington and New Galilee, townships of Big Beaver, Darlington and South Beaver, Beaver County, Pa., has filed with the Public Service Commission a new tariff to become effective December 1, 1923, which increases the rate per thousand cubic feet from 55 cents gross or 50 cents net to 65 cents gross or 60 cents net.